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OBSERVED DEVIATIONS IN RAINFALL AT DARTONFIELD DURING THE RECENT PAST

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INTRODUCTION

Climatic change is a current topic in newspapers, popular science articles and in many other sources of information. These changes interfere with the biological phenomena causing different impacts on plant growth and hence productivity. Rubber production depends on good management practices and on factors mostly related to the weather, over which the growers have no control. It is an accepted fact that the total number of tapping days determines the economic yield of rubber which depends on number of rainy days.

Rainfall is of great concern to the rubber grower as it affects the tree at all stages of growth from planting through felling. Hence, any changes in the seasonal pattern may have adverse impact on the application of recommended agronomic practices in rubber plantations. Apart from the management practices, disease incidence, flowering, pod set and pod ripening are closely linked with seasonal pattern of weather factors. Recent studies conducted by the Rubber Research Institute revealed low seed production in most of the rubber growing areas in the wet zone (Seneviratne *et. al.*, 1999). This has become a major threat in production of quality planting materials through budding techniques. During the past few years, several leaf diseases also appeared as epidemics due to the conducive weather pattern for initiation and spreading of leaf diseases (Annual Reviews of RRISL; 1997, 1998 and 1999).

This article is focused on the rainfall variability comparing the periods; 1991 to 2000 with the previous records observed from 1968. Long-term variations in annual, seasonal and monthly rainfall are discussed in this article.

METHODOLOGY

Data

Data on rainfall collected at the meteorological station at Dartonfield during 1968 to 2000 were used in illustrations.

RESULTS AND DISCUSSION

Dartonfield meteorological station is situated in the agro-ecological zone of WL_1, where the rainfall pattern is bimodal with peaks coinciding May and

October/November periods. The peak in May (615 mm) is generally higher, when compared to the peak (450 mm) in October/November period. January and February have averages around 125 – 130 mm. March, July, August and December have monthly totals falling in the range of 270 – 290 mm. The peak periods; April, May, June and September, October, November have rainfall totals exceeding 400 mm.

The annual rainfall observed since 1968 is presented in Fig. 1, which indicates a random event with frequent rises and falls in the series. The lowest rainfall totals (about 3200 mm) per year were observed in 1980 and 1983. Since then, only in two occasions in 1990 and 1996 the rainfall totals dropped to 3500 and 3700 mm, respectively.

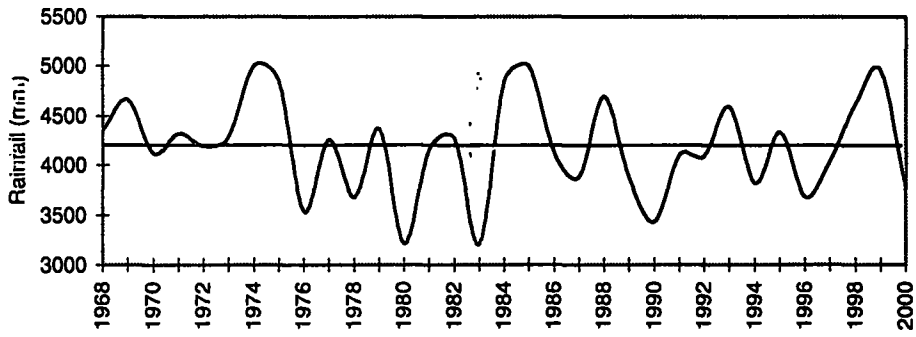
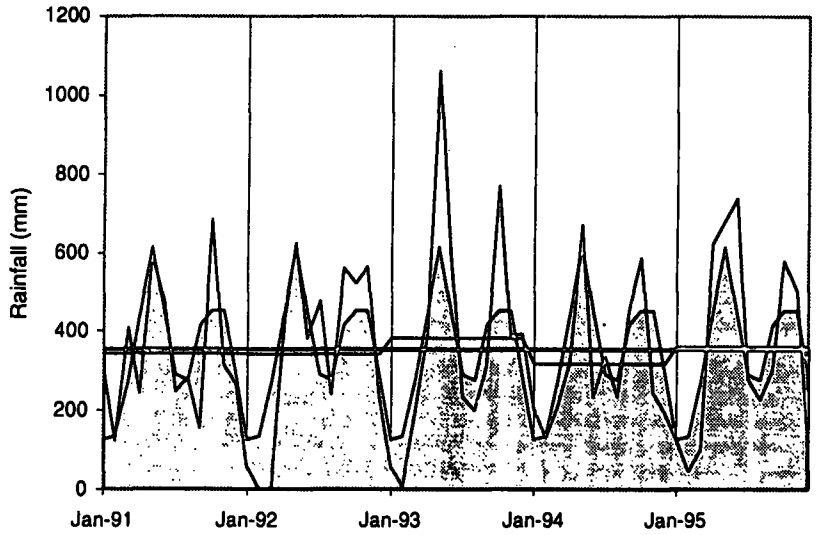


Fig. 1. Total annual rainfall experienced at Dartonfield since 1968

Monthly totals of rainfall experienced in the period, 1991-2000 are presented in Fig. 2, together with the seasonal pattern in shaded area. The stepped lines over the thick straight line indicate the years with total annual rainfall exceeding the long-term average and stepped lines below the straight line indicate years with rainfall less than the long-term average. The expected bimodal pattern is observed in the period 1991-1995, except some deviations in the amount of rainfall. Hardly any deviations due to shifting of rainy seasons are observed during this period. In 1993, both peaks were higher than the average. From 1996 onwards there was a tendency to exceed the average peak at the end of each year. Moreover, a forward shift is observed in the peak at the end of the year.

In general, the rainfall seasons can be broadly classified in to 4 main seasons; *viz:*.

(a) North-East rainy season (NE) - end of November to mid March,
(b) First inter-monsoon (IM-1) - late March to early May,
(c) South-West rainy season (SW) - late May to end of August, and
(d) Second inter-monsoon (IM-2) - September to mid November.



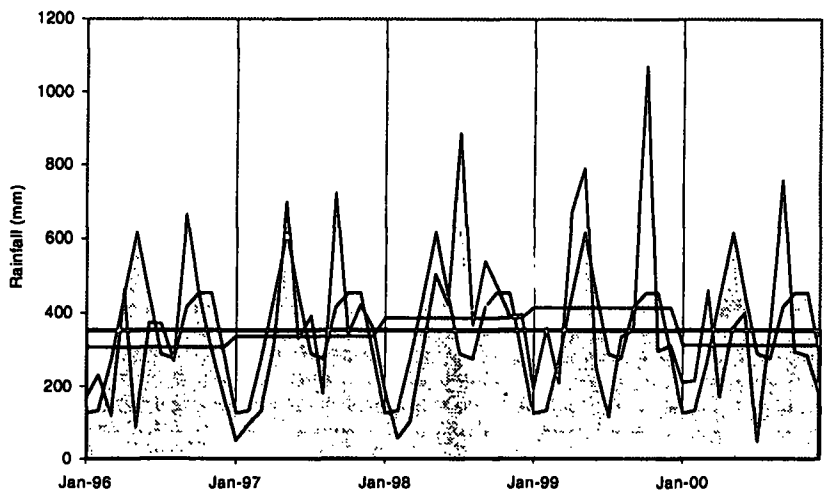


Fig. 2. Deviations from monthly totals from the long-term averages for the period 1991 – 2000.

South-West (SW) rains bring nearly 32% of the total rainfall while North-East (NE) rains contributes about 20%. The rest of the contribution (48%) comes from the inter-monsoons. When the long-term variation in the rainfall seasons are concerned, the usual random pattern over and below the average is observed only in the SW rainy season. Rainfall season, IM-2 showed an increasing trend (Fig. 3). This is mainly due to the high rainfall in September/October period as shown in Fig. 4, which compares the recent past with preceding decades.

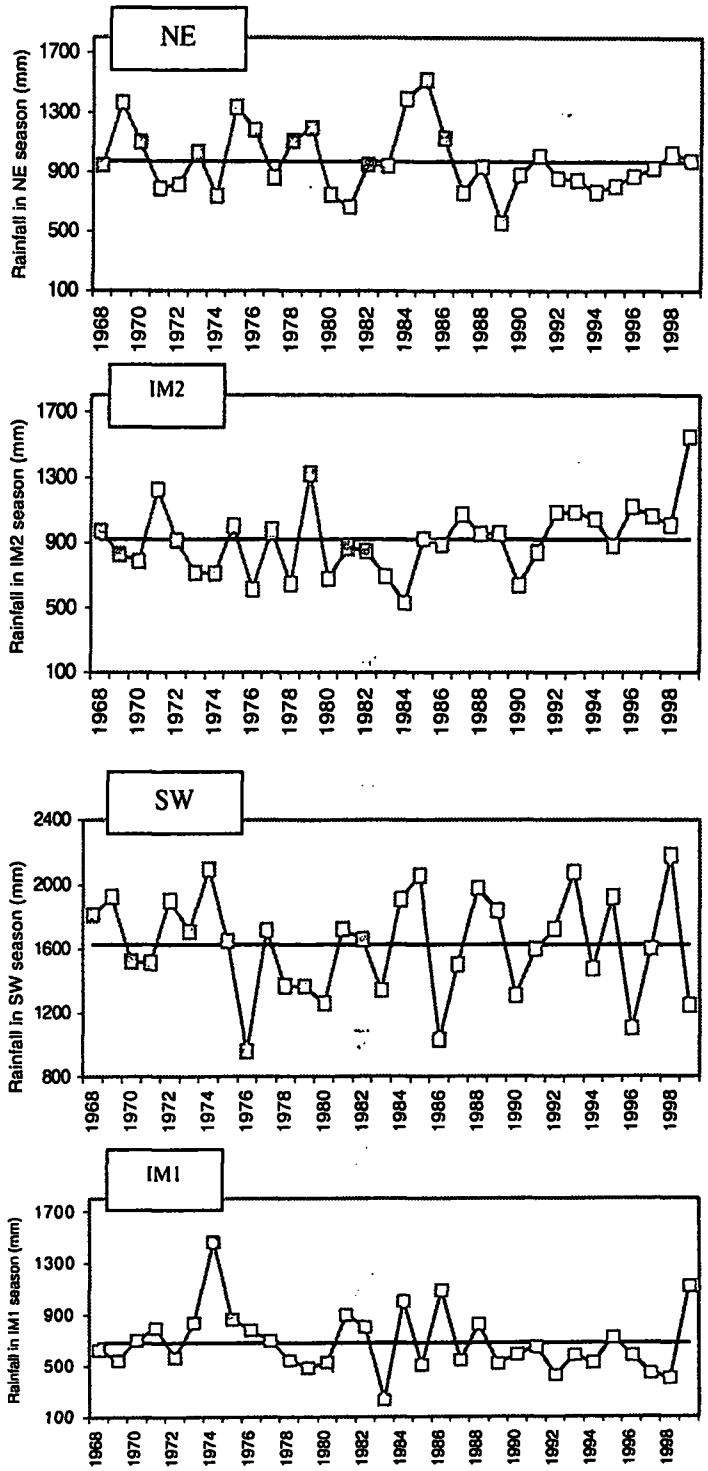


Fig. 3. Variation in seasonal rainfall at Dartonfield.

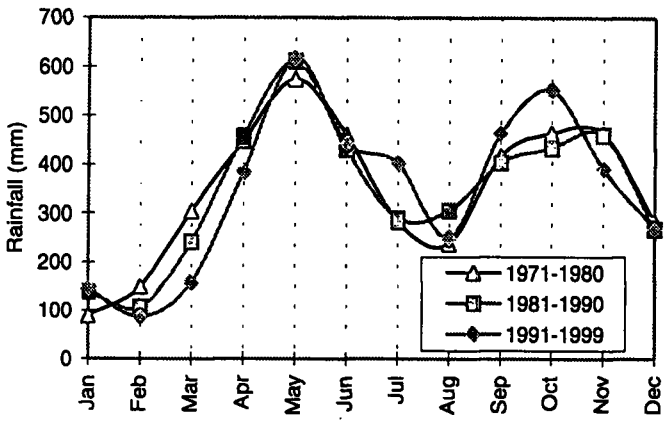


Fig. 4. Variation in rainfall pattern at Dartonfield for different periods

North-East rains recorded below average values during recent years (Fig. 3). This may be due to the forward shift observed in rainfall during the latter part of the year The IM-1 season following NE season also showed below average values. The declining behaviour of rainfall in March (Fig. 5) may be the reason for the decreasing rainfall pattern in both IM-1 and NE seasons, as March belongs to both the seasons.

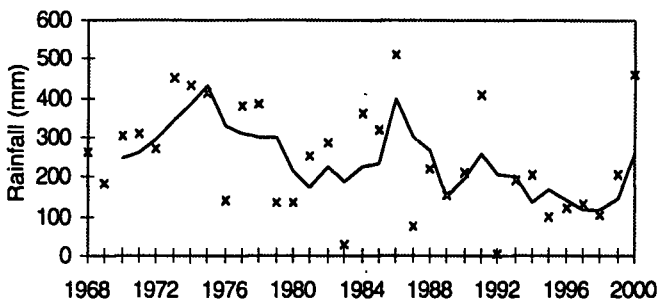


Fig. 5. Total rainfall for March together with the moving average from 1968 to 2000

The descriptive analyses suggest that the rainfall during last 5 years deviated from the long-term seasonal pattern. The annual rainfall showed a random fluctuation around the mean. Moreover, prominent deviations were observed in rainfall seasons. Therefore, detailed analyses on probability of onset and cease of rainy seasons and risk associated with dry spells are to be carried out to investigate any deviations with respect to the time of year. These findings may be subsequently used in defining crop calendars, which suit the existing rainfall pattern. However, one should keep in mind that these changes may be temporary, but should keep a track on them to find ways to minimize crop losses or any other detrimental effects to crop growth. Consequently,

attention should be paid to avoid any damages due to diseases and to minimize wastage of inputs such as fertilizer and agro-chemicals to minimize the adverse effects of climatic changes on the productivity of rubber lands.

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